Claims

1. A rear plate of a plasma display panel, the rear plate comprising:

a glass substrate;

electrodes formed in a shape of patterns on an upper surface of the glass substrate;

a dielectric layer formed on upper surfaces of the electrode and the upper surface of the glass substrate;

barrier walls formed in a shape of a pattern through etching on an upper surface of the dielectric layer; and

phosphorous layers formed on side surfaces and bottom surfaces of the barrier walls, wherein:

[each of]the electrodes has a thickness of 2 to 8 μm and a specific resistance of 1.0×10^{-6} to 5.0×10^{-6} Ωcm;

the dielectric layer is made from a first mixture which includes a first filler and at least one glass powder selected from among a first glass powder and a second glass powder, the first glass powder including PbO of 30 to 80 wt%, ZnO of 0 to 20 wt%, SiO_2 of 0 to 20 wt%, B_2O_3 of 5 to 40 wt%, Al_2O_3 of 0 to 12 wt%, $Na_2O+K_2O+Li_2O$ of 0 to 5 wt%, and BaO+CaO+MgO+SrO of 0 to 5 wt%, the second glass powder including Bi_2O_3 of 36 to 84 wt%, B_2O_3 of 5 to 28 wt%, PbO of 0 to 46 wt%, ZnO of 0 to 30 wt%, Al_2O_3 of 0 to 13 wt%, SiO_2 of 0 to 10 wt%, $Na_2O+K_2O+Li_2O$ of 0 to 5 wt%, and BaO+CaO+MgO+SrO of 0 to 3 wt%, each of the first and second glass powders

having an average particle diameter of 1 to 10 μm, a softening temperature of 390 to 550 °C, and a thermal expansive coefficient of 63 × 10^{-7} to 83 × 10^{-7}/°C, the first filler having an average particle diameter of 0.01 to 10 μm, the dielectric layer having a dielectric constant of 8 to 20, a reflectance of 50 to 80%, an etching rate of 0.01 to 1.0 μm/min with respect to inorganic acid, and a thickness of 10 to 30 μm;

the barrier walls are made from a second mixture which includes a second filler, organic material, additives, and at least one glass powder selected from the group consisting of a third, fourth, and fifth glass powders, the third glass powder including ZnO of 0 to 48 wt%, SiO_2 of 0 to 21 wt%, B_2O_3 of 25 to 56 wt%, Al_2O_3 of 0 to 12 wt%, $Na_2O+K_2O+Li_2O$ of 0 to 38 wt%, and BaO+CaO+MgO+SrO of 0 to 15 wt%, the fourth glass powder including PbO of 25 to 65 wt%, ZnO of 0 to 35 wt%, SiO_2 of 0 to 26 wt%, B_2O_3 of 0 to 30 wt%, $Al_2O_3+SnO_2$ of 0 to 13 wt%, $Na_2O+K_2O+Li_2O$ of 0 to 19 wt%, BaO of 0 to 26 wt%, and CaO+MgO+SrO of 0 to 13 wt%, the fifth glass powder including PbO of 35 to 55 wt%, B_2O_3 of 18 to 25 wt%, ZnO of 0 to 35 wt%, BaO of 0 to 16 wt%, $SiO_2+Al_2O_3+SnO_2$ of 0 to 9 wt%, $CoO+CuO+MnO_2+Fe_2O_3$ of 0 to 15 wt%, $Na_2O+K_2O+Li_2O$ of 0 to 19 wt%, and CaO+MgO+SrO of 0 to 13 wt%, the third glass powder having a softening temperature of 460 to 630 °C, a thermal expansive coefficient of 64 × 10^{-7} to 105 × 10^{-7}/°C, and an average particle diameter of 0.5 to 17 μm, each of the fourth and fifth glass powders having a softening temperature

of 390 to 550 °C, a thermal expansive coefficient of 63 × 10^{-7} to 110 × 10^{-7}/°C, and an average particle diameter of 0.5 to 17 μm, the second filler having an average particle diameter of 0.01 to 10 μm, the barrier walls being formed with a height of 100 to 180 μm by attaching a barrier wall layer formed in a shape of green tapes to an upper surface of the dielectric layer, firing the barrier wall layer together with the dielectric layer at a temperature between 400°C and 700 °C, and then etching the barrier wall layer, the barrier wall layer having a dielectric constant of 5 to 18, a reflectance of 40 to 80%, an etching rate of 1.0 to 50.0 μm/min with respect to inorganic acid;

[each of]the phosphorous layers have a thickness of 10 to 50 μm; and

a difference between the thermal expansive coefficients of the dielectric layer and the barrier wall layer has a percentage between 0 and 10 %, and a difference between the softening temperatures of the dielectric layer and the barrier wall layer has a value between 0 and 20 °C.

2. A rear plate of a plasma display panel, the rear plate comprising:

a glass substrate;

electrodes formed in a shape of patterns on an upper surface of the glass substrate;

a dielectric layer formed on upper surfaces of the electrode and the upper surface of the glass substrate;

barrier walls formed in a shape of a pattern through etching on an upper surface of the dielectric layer; and

phosphorous layers formed on side surfaces and bottom surfaces of the barrier walls, wherein:

[each of]the electrodes has a thickness of 2 to 8 μm and a specific resistance of 1.0×10^{-6} to 5.0×10^{-6} Ωcm;

the dielectric layer is made from a first mixture which includes a first filler, organic material, additives, and at least one glass powder selected from among a first glass powder and a second glass powder, the first glass powder including PbO of 30 to 80 wt%, ZnO of 0 to 20 wt%, SiO_2 of 0 to 20 wt%, B_2O_3 of 5 to 40 wt%, Al_2O_3 of 0 to 12 wt%, $Na_2O+K_2O+Li_2O$ of 0 to 5 wt%, and BaO+CaO+MgO+SrO of 0 to 5 wt%, the second glass powder including Bi_2O_3 of 36 to 84 wt%, B_2O_3 of 5 to 28 wt%, PbO of 0 to 46 wt%, ZnO of 0 to 30 wt%, Al_2O_3 of 0 to 13 wt%, SiO_2 of 0 to 10 wt%, $Na_2O+K_2O+Li_2O$ of 0 to 5 wt%, and BaO+CaO+MgO+SrO of 0 to 3 wt%, each of the first and second glass powders having an average particle diameter of 1 to 10 μm, a softening temperature of 390 to 550 °C, and a thermal expansive coefficient of 63×10^{-7} to 83×10^{-7}/°C, the first filler having an average particle diameter of 0.01 to 10 μm, the dielectric layer having a dielectric constant of 8 to 20, a reflectance of 50 to 80%, an etching rate of 0.01 to 1.0 μm/min with respect to inorganic acid, and a thickness of 10 to 30 μm, the

dielectric layer being formed in a shape of a green tape and then attached to upper surfaces of the electrodes;

the barrier walls are made from a second mixture which includes a second filler, organic material, additives, and at least one glass powder selected from the group consisting of a third, fourth, and fifth glass powders, the third glass powder including ZnO of 0 to 48 wt%, SiO_2 of 0 to 21 wt%, B_2O_3 of 25 to 56 wt%, Al_2O_3 of 0 to 12 wt%, $Na_2O+K_2O+Li_2O$ of 0 to 38 wt%, and $BaO+CaO+MgO+SrO$ of 0 to 15 wt%, the fourth glass powder including PbO of 25 to 65 wt%, ZnO of 0 to 35 wt%, SiO_2 of 0 to 26 wt%, B_2O_3 of 0 to 30 wt%, $Al_2O_3+SnO_2$ of 0 to 13 wt%, $Na_2O+K_2O+Li_2O$ of 0 to 19 wt%, BaO of 0 to 26 wt%, and $CaO+MgO+SrO$ of 0 to 13 wt%, the fifth glass powder including PbO of 35 to 55 wt%, B_2O_3 of 18 to 25 wt%, ZnO of 0 to 35 wt%, BaO of 0 to 16 wt%, $SiO_2+Al_2O_3+SnO_2$ of 0 to 9 wt%, $CoO+CuO+MnO_2+Fe_2O_3$ of 0 to 15 wt%, $Na_2O+K_2O+Li_2O$ of 0 to 19 wt%, and $CaO+MgO+SrO$ of 0 to 13 wt%, the third glass powder having a softening temperature of 460 to 630 °C, a thermal expansive coefficient of 64×10^{-7} to 105×10^{-7}/°C, and an average particle diameter of 0.5 to 17 μm, each of the fourth and fifth glass powders having a softening temperature of 390 to 550 °C, a thermal expansive coefficient of 63 $\times 10^{-7}$ to 110×10^{-7}/°C, and an average particle diameter of 0.5 to 17 μm, the second filler having an average particle diameter of 0.01 to 10 μm, the barrier walls being formed with a height of 100 to 180 μm by

attaching a barrier wall layer formed in a shape of green tapes to an upper surface of the dielectric layer, firing the barrier wall layer together with the dielectric layer at a temperature between 400°C and 700 °C, and then etching the barrier wall layer, the barrier wall layer having a dielectric constant of 5 to 18, a reflectance of 40 to 80%, and an etching rate of 1.0 to 50.0 μm/min with respect to inorganic acid;

[each of]the phosphorous layers have a thickness of 10 to 50 μm; and

a difference between the thermal expansive coefficients of the dielectric layer and the barrier wall layer has a percentage between 0 and 10 %, and a difference between the softening temperatures of the dielectric layer and the barrier wall layer has a value between 0 and 20 °C.

3. A rear plate of a plasma display panel, the rear plate comprising:

a glass substrate;

electrodes formed in a shape of patterns on an upper surface of the glass substrate;

a dielectric layer formed on upper surfaces of the electrode and the upper surface of the glass substrate;

barrier walls formed in a shape of a pattern through etching on an upper surface of the dielectric layer; and

phosphorous layers formed on side surfaces and bottom surfaces of the barrier walls, wherein:

[each of]the electrodes has a thickness of 2 to 8 μm and a specific resistance of 1.0×10^{-6} to 5.0×10^{-6} Ωcm;

the dielectric layer is made from a first mixture which includes a first filler, organic material, additives, and at least one glass powder selected from among a first glass powder and a second glass powder, the first glass powder including PbO of 30 to 80 wt%, ZnO of 0 to 20 wt%, SiO_2 of 0 to 20 wt%, B_2O_3 of 5 to 40 wt%, Al_2O_3 of 0 to 12 wt%, $Na_2O+K_2O+Li_2O$ of 0 to 5 wt%, and BaO+CaO+MgO+SrO of 0 to 5 wt%, the second glass powder including Bi_2O_3 of 36 to 84 wt%, B_2O_3 of 5 to 28 wt%, PbO of 0 to 46 wt%, ZnO of 0 to 30 wt%, Al_2O_3 of 0 to 13 wt%, SiO_2 of 0 to 10 wt%, $Na_2O+K_2O+Li_2O$ of 0 to 5 wt%, and BaO+CaO+MgO+SrO of 0 to 3 wt%, each of the first and second glass powders having an average particle diameter of 1 to 10 μm, a softening temperature of 390 to 550 °C, and a thermal expansive coefficient of 63×10^{-7} to 83×10^{-7}/°C, the first filler having an average particle diameter of 0.01 to 10 μm, the dielectric layer having a dielectric constant of 8 to 20, a reflectance of 50 to 80%, an etching rate of 0.01 to 1.0 μm/min with respect to inorganic acid, and a thickness of 10 to 30 μm, the dielectric layer being formed in a shape of a green tape;

the barrier walls are made from a second mixture which includes a second filler, organic material, additives, and at least one glass powder selected from

the group consisting of a third, fourth, and fifth glass powders, the third glass powder including ZnO of 0 to 48 wt%, SiO_2 of 0 to 21 wt%, B_2O_3 of 25 to 56 wt%, Al_2O_3 of 0 to 12 wt%, $Na_2O+K_2O+Li_2O$ of 0 to 38 wt%, and BaO+CaO+MgO+SrO of 0 to 15 wt%, the fourth glass powder including PbO of 25 to 65 wt%, ZnO of 0 to 35 wt%, SiO_2 of 0 to 26 wt%, B_2O_3 of 0 to 30 wt%, $Al_2O_3+SnO_2$ of 0 to 13 wt%, $Na_2O+K_2O+Li_2O$ of 0 to 19 wt%, BaO of 0 to 26 wt%, and CaO+MgO+SrO of 0 to 13 wt%, the fifth glass powder including PbO of 35 to 55 wt%, B_2O_3 of 18 to 25 wt%, ZnO of 0 to 35 wt%, BaO of 0 to 16 wt%, $SiO_2+Al_2O_3+SnO_2$ of 0 to 9 wt%, $CoO+CuO+MnO_2+Fe_2O_3$ of 0 to 15 wt%, $Na_2O+K_2O+Li_2O$ of 0 to 19 wt%, and CaO+MgO+SrO of 0 to 13 wt%, the third glass powder having a softening temperature of 460 to 630 °C, a thermal expansive coefficient of 64 × 10^{-7} to 105 × 10^{-7}/°C, and an average particle diameter of 0.5 to 17 μm, each of the fourth and fifth glass powders having a softening temperature of 390 to 550 °C, a thermal expansive coefficient of 63 × 10^{-7} to 110 × 10^{-7}/°C, and an average particle diameter of 0.5 to 17 μm, the second filler having an average particle diameter of 0.01 to 10 μm;

[each of]the phosphorous layers have a thickness of 10 to 50 μm; and

a difference between the thermal expansive coefficients of the dielectric layer and the barrier wall layer has a percentage between 0 and 10 %, and a difference between the softening temperatures of the dielectric layer and the barrier wall layer has a value

between 0 and 20 °C, wherein

a barrier wall layer formed in a shape of green tapes, which has a dielectric constant of 5 to 18, a reflectance of 40 to 80%, and an etching rate of 1.0 to 50.0 μm/min with respect to inorganic acid, is integrated with the dielectric layer to form a lamination of dielectric layer/ barrier wall layer, and the lamination of dielectric layer/ barrier wall layer is attached to the upper surfaces of the electrodes and the glass substrate, is baked at a temperature between 400°C and 700 °C, and is then etched, so that the barrier walls are formed with a height of 100 to 180 μm.

4. A rear plate of a plasma display panel as claimed in any of claims 1 to 3, wherein each of the barrier walls has at least two different layers having different etching rates with respect to inorganic acid.